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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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08/276,797 07/18/94 OWEN

M 2686033:37US

MILLS EXAMINER

21M1/0617

STOEL RIVES BOLEY JONES & GREY  
900 SW FIFTH AVENUE SUITE 2300  
PORTLAND OR 97204-1268

ART UNIT

PAPER NUMBER

2106

DATE MAILED:

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06/17/96

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

# Office Action Summary

Application No.  
**08/276,797**

Applicant(s)  
**Owen et al.**

Examiner  
**Gregory L. Mills**

Group Art Unit  
**2106**



☒ Responsive to communication(s) filed on 2/1/96

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire three month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

## Disposition of Claims

☒ Claim(s) 1-13, 15-17, and 22-30 is/are pending in the application.

Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1-13, 15-17, and 23-30 is/are rejected.

☒ Claim(s) 22 is/are objected to.

☐ Claims \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been  
☐ received.

☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

☐ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 8, 13

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --  
(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1-10, 12, 24, 25, 28, and 29 are rejected under 35 U.S.C. § 102(a) as being anticipated by the fall 1993 issue of "LaserPulse" published by Electro Scientific Industries, Inc.

Referring to pages 6 and 7 and the unnumbered page entitled "4420 Laser Micromachining System", the fall 1993 issue of LaserPulse discloses a method of laser processing multi-layered targets comprising generating high power UV laser pulses from an ESI Model 4420 solid state Nd:YAG laser system operating at a wavelength of 266 nm (page 6) which produces 45 nanosecond pulses having average powers of 300 mW at a repetition rate of 2 kHz (as shown on the unnumbered page), and applying the above pulses to multi-layered targets to cleanly remove at least two layers having different compositions and absorption characteristics (see the figures on pages 6 and 7). The targets include Novaclad (page 6) which is a copper-polyimide laminate. A laminate with three different layers is shown after processing at the bottom right of page 7. Vias of 25 micron diameter are formed (page 6), indicating that the laser is focused to a spot of no more than 25

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µm. At the top of page 7, larger 6 mil vias are formed. At the bottom of page 7, through holes having aspect ratios greater than 2 are formed.

3. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. § 103, the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 C.F.R. § 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of potential 35 U.S.C. § 102(f) or (g) prior art under 35 U.S.C. § 103.

4. Claim 11 is rejected under 35 U.S.C. § 103 as being unpatentable over the fall 1993 fall 1993 issue of LaserPulse as

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applied to claims 1-10, 12, 24, 25, 28, and 29 above, and further in view of U.S. Patent 4,761,786 to Baer.

The fall 1993 issue of LaserPulse discloses the invention substantially as claimed, but does not show a YAG laser doped with holmium or erbium.

Referring to the abstract, Baer teaches doping YAG lasers with holmium or erbium to increase the laser's energy storage ability. It would have been obvious to one of ordinary skill in the art at the time the invention was made to dope the YAG laser of the fall 1993 issue of LaserPulse with holmium or erbium to increase its energy storage ability as taught by Baer.

5. Claims 13, 15, 26, 27, and 30 are rejected under 35 U.S.C. § 103 as being unpatentable over the fall 1993 fall 1993 issue of LaserPulse as applied to claims 1-10, 12, 24, 25, 28, and 29 above, and further in view of U.S. Patent 4,894,115 to Eichelberger et al.

The fall 1993 issue of LaserPulse discloses the invention substantially as claimed, but does not show the spatial spot size being smaller than a spatial region of the target or the output pulses being sequentially directed to multiple positions within the spatial region.

Referring to Figures 2A-2C, for example, Eichelberger teaches a method of forming vias by laser ablation which includes

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using a beam with a spatial spot size smaller than a spatial region of the target, and directing the beam to multiple positions within the spatial region to remove multiple amounts of material. The beam is applied along a periphery (130) of the via. Eichelberger teaches that the above method allows vias of various sizes and shapes to be formed as desired. See col. 3, lines 19-23. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a beam with a spatial spot size smaller than a spatial region of the target area and to direct the beam pulses sequentially to multiple portions of the spatial region to form vias of different sizes and shapes as taught by Eichelberger.

Regarding claims 26 and 27, the three-material structure shown at the lower right of page 7 in LaserPulse would have suggested to one of ordinary skill in the art a target of copper, polyimide, and ceramic, for example, since such structures are commonly used to form interconnect devices such as MCM's.

6. Claims 16 and 17 are rejected under 35 U.S.C. § 103 as being unpatentable over the fall 1993 fall 1993 issue of LaserPulse in view of Eichelberger as applied to claims 13, 15, 26, 27, and 30 above, and further in view of U.S. Patent 3,931,458 to Dini.

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The fall 1993 issue of LaserPulse in view of Eichelberger discloses the invention substantially as claimed, but does not show using an outwardly spiraling beam path to form a blind via.

The inclusion of blind vias in multi-layer electrical devices is old and well-known in the art. Using laser ablation to form such blind vias was also known in the art at the time the invention was made. To one of ordinary skill in the art at the time the invention was made, it would have been an obvious use of the LaserPulse method to form a blind via.

Referring to Figures 1-4, Dini discloses a laser etching method which includes moving the beam outwardly from a central portion of a region in a spiral path. Dini teaches that the depth of etching may be easily controlled by controlling the tightness of the spiral. Compare Figures 1 and 3 with Figures 2 and 4. It would have been obvious to one of ordinary skill in the art at the time the invention was made to form blind vias using an outwardly spiralling path to allow easy control of the vias depth as taught by Dini.

7. Claim 23 is rejected under 35 U.S.C. § 103 as being unpatentable over the fall 1993 issue of LaserPulse.

The fall 1993 issue of LaserPulse discloses the invention substantially as claimed, but does not show blind via formation.

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The inclusion of blind vias in multi-layer electrical devices is old and well-known in the art. Using laser ablation to form such blind vias was also known in the art at the time the invention was made. To one of ordinary skill in the art at the time the invention was made, it would have been an obvious use of the LaserPulse method to form a blind via.

8. Claim 22 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. Applicant's arguments filed 2/1/96 have been fully considered but they are not deemed to be persuasive.

Applicant has argued that the LaserPulse publication ("LaserPulse") is not available as prior art against the presently claimed invention. Applicant has apparently attempted to show that the relevant portions of LaserPulse were derived from Mr. Owen, citing MPEP 715.01(c). Applicant has failed to properly show that the relevant portions of LaserPulse were derived from Mr. Owen. More importantly, such a showing would not, in and of itself, remove LaserPulse as available prior art.

As noted first above, applicant has not properly shown derivation. While Mr. Owen's declaration states that he "wrote

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the text" of "UV Laser Micromachining Applications Continue to Grow" appearing on pages 6 and 7 of LaserPulse and provided the accompanying photographs, *it does not state that the invented the subject matter disclosed therein.* Mr. Dwight's declaration states that Mr. Owen invented this subject matter, but it is not clear how a person "responsible for organizing the content and layout" of the publication would be in a position to know who was the inventor, in the legal sense of the term, of this subject matter. Also, the "4420 brochure" remains unattributed. Applicant has therefore not properly shown that the subject matter in LaserPulse relied upon by the examiner in making the rejection was derived from Mr. Owen.

As noted above, even a proper showing that LaserPulse was derived from Mr. Owen would not overcome the rejection. "By others" (35 USC 102(a)) means any combination of authors which is different than the inventive entity of the subject application (MPEP 2132(c)). "Inventive entity" is synonymous with "applicant" and collectively refers to all of the inventors listed in the application. The inventive entity of the instant application is Mr. Owen and Mr. O'Brien, while the author of LaserPulse is apparently Mr. Owen alone. Thus LaserPulse has a different inventive entity than the instant application and is therefore a publication "by others".


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Applicant's remaining arguments are predicated on LaserPulse being "effectively removed as prior art", which is not the case, and are therefore not convincing.

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory Mills whose telephone number is (703) 308-1633. Faxes may be sent to (703) 305-3431 or (703) 305-3432.

  
Gregory Mills  
June 11, 1996

  
TERESA J. WALBERG  
SUPERVISORY PATENT EXAMINER  
GROUP 2100